

Municipal Drone Use

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Agenda:

- Why use a drone?
- Launching your drone program
 - Choosing your drone
 - FAA requirements & training
- Vernon Hills proof of concept & drone product examples
- Mission planning demo

Why use a drone?

- Drones are cool, but that doesn't automatically mean they're a worthwhile investment.
- A drone is a tool, and they should address needed capabilities or do an existing job better.
- If you are considering a drone program, try to prove a ROI. Drones, accessories, and training are not cheap; it's an expensive asset that's easily lost/broken/crashed.



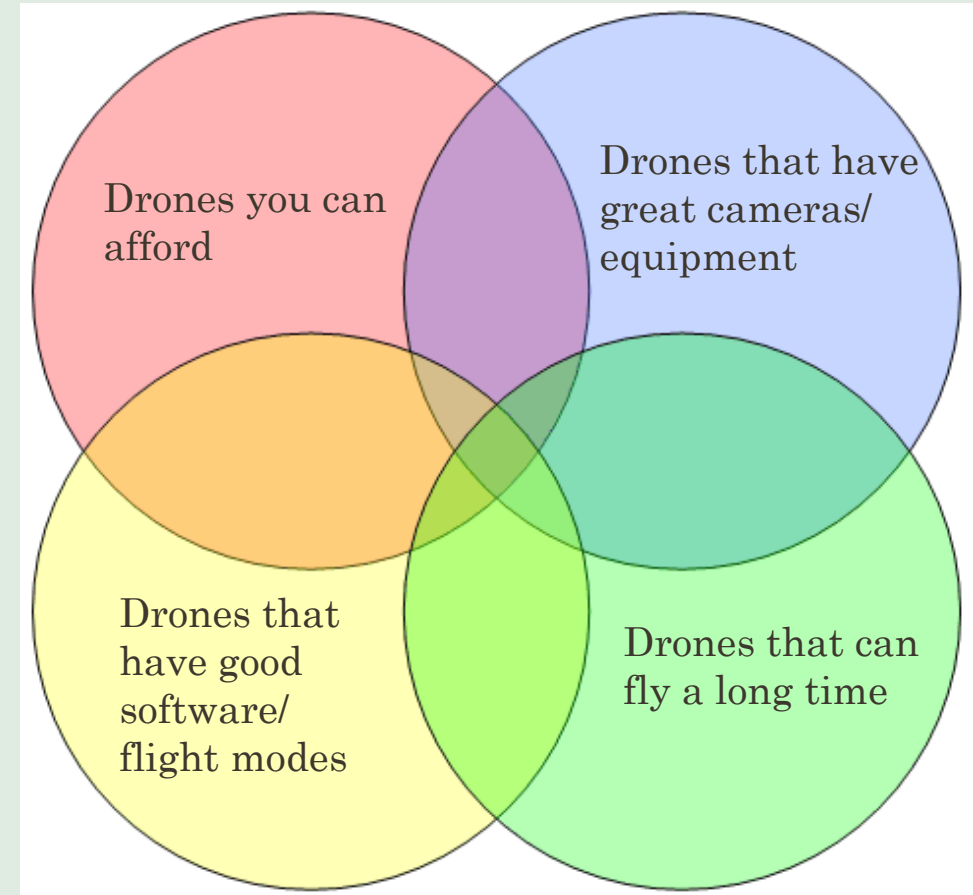
Launching your drone program

- Step 1: Choosing a drone - harder than it sounds. Choose the drone that fits the job, not the other way around.
- Step 2: Get trained! - In order to fly a sUAS (small unmanned air system) as a government or commercial employee, you need to have an unmanned pilot license from the FAA. (You do not need one as a hobbyist). In addition to FAA regulation training, additional hands-on drone flight training is highly recommended.
- Step 3: Plan! – Need a plan to use the drone to solve problems or improve workflow.

Launching your drone program: Choose Wisely

Picking a drone is a balancing act between 4 main characteristics:

- Cost
- Flight time
- Camera Quality
- Software/Options/Capability

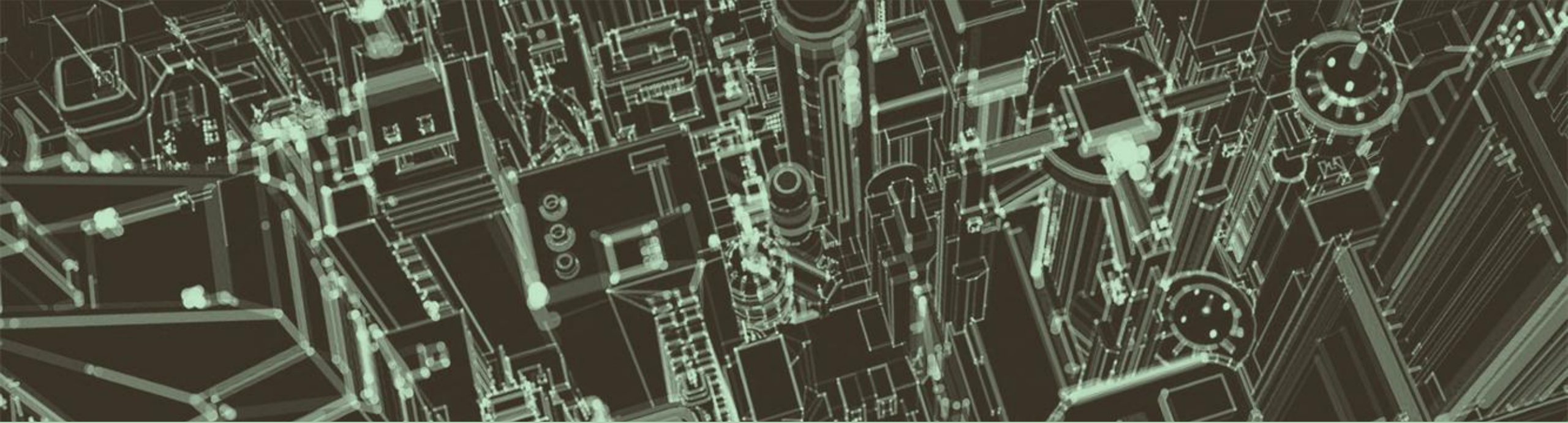


Launching your drone program: Choose Wisely

Three basic groups of drones:

- **Fixed wing:**
 - longer flights, cover large areas
 - no hover, landing can be “interesting”
- **Multi-rotor / Quadcopter**
 - hover for close-in work, takeoff & landings easy
 - shorter endurance
- **Hybrid**
 - attempts to do both, new niche, few options at this time





Drone Questions?

Drone choices, capabilities, etc?



Launching your drone program: FAA & Training

Most municipal drone use will operate under [Part 107 FAA regulations](#)

What is Part 107? Part 107 is a set of rules the FAA came up with to regulate the flight of drones.

Some major points:

- 400' max altitude
- daylight flight only
- maintain visual contact with drone at all times
- cannot operate directly over people

Launching your drone program: FAA & Training

As a government / municipal operator of a UAS, an FAA sUAS license will be needed.

- The sUAS license from the FAA requires you to pass a 60 question test
- You need a 70% to pass
- The test is pretty hard (in my opinion). You cannot go in there and “wing it”. Study!
- The test costs \$150. If you fail, you have to wait 2 weeks before you spend another \$150 and take it again.
- You will have to take and pass the test every two years to maintain your sUAS license.

Launching your drone program: FAA & Training

When out flying the drone, you need these items **on your person**:

- Your FAA drone registration (\$5)
- Your FAA sUAS license (card like a driver's license)
- Your drone must be marked with its FAA certificate number. A simple label maker works fine.

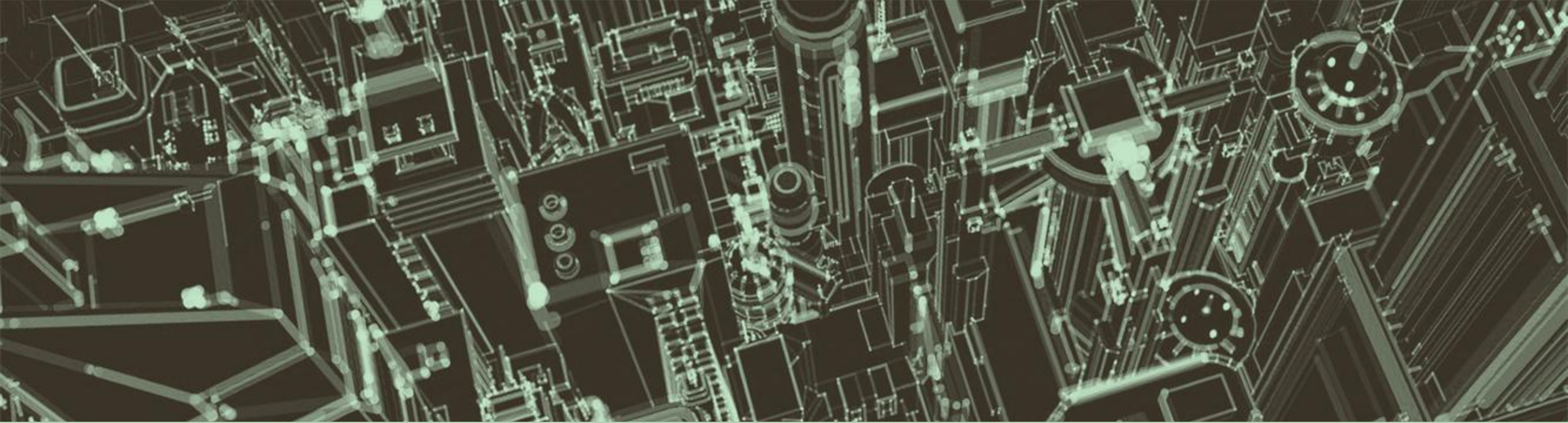


Launching your drone program: FAA & Training

Hands on training:

- While not required to pass the FAA test, I'd highly recommend it.
- Courses are held nationwide and cost around \$500 for a full day.
- I used [DartDrones](#), but many other options exist.





FAA Questions?

Tests, training, regulations, etc?



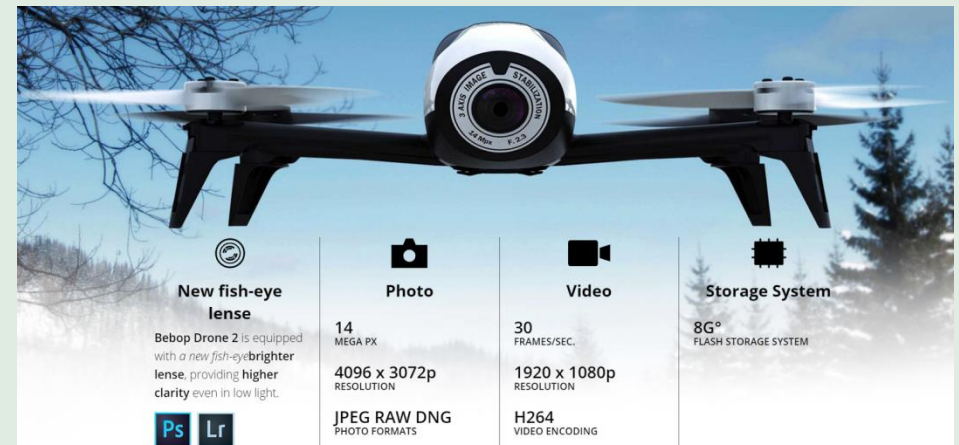
Vernon Hills Proof of Concept

I was fairly confident I couldn't get the Village to buy a drone without some kind of proof of concept demonstrating value. However Vernon Hills agreed to pay for drone training out of the existing GIS training budget.

I personally bought a drone and began to outline ways drone products could be useful to Vernon Hills. I took ideas found in GIS publications and talked with department heads to develop a drone program.

We came up with the following:

- Seavey Ditch Inspection
- Cell Tower Inspection
- Village Facility Inspections
- Available Sites
- Building Dept. Inspections



Vernon Hills Proof of Concept: Seavey Ditch Inspection

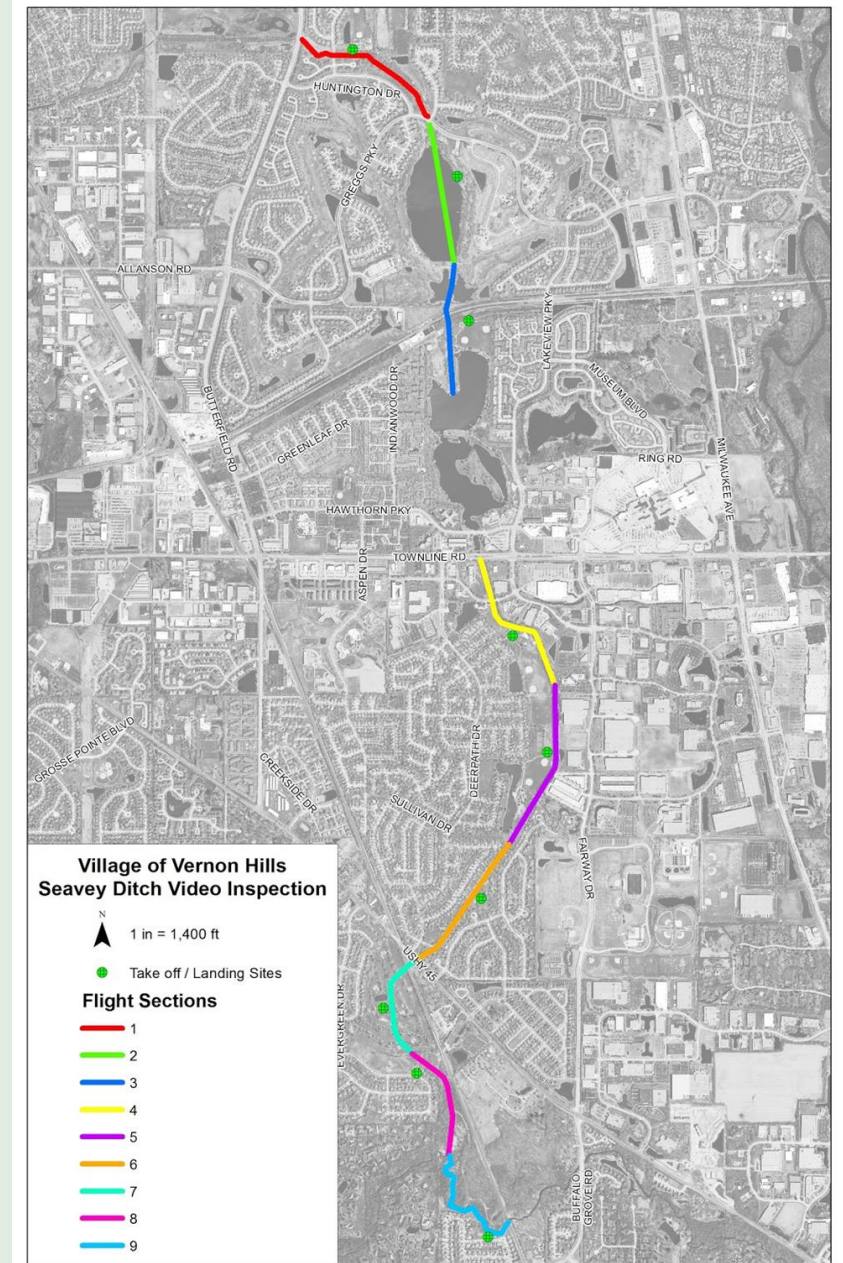
Instead of inspecting the Seavey Ditch on foot, fly a drone. Saves time & manpower \$\$\$

The Seavey Ditch can be safely broken up into 9 flight sections, based on drone battery endurance.

Parks along Seavey make perfect takeoff / landing sites.
The entire length of the Seavey Ditch could be inspected in 1 working day, taking about 60 minutes of actual flight time.

Vernon Hills Park District used the footage to work with a contractor to clear obstructions through Sullivan Woods.

<http://arcg.is/2g4yh1a>



Vernon Hills Proof of Concept: Cell Tower Inspections

As the Village has microwave links attached to our 3 cell towers, the need arises to take a look and make sure there are no problems / obstructions with the equipment.

Rather than paying a contractor to climb the towers and inspect the equipment, we can do this with a drone.



Vernon Hills Proof of Concept: Village Facility Inspections

Public Works expressed interest in using the drone to quickly inspect the roofing of all Village facilities. After doing a test inspection, Public Works indicated this was very helpful and want to continue doing this in the future.



Vernon Hills Proof of Concept: Available Sites

In an effort to help developers better understand the commercially available sites in Vernon Hills, I've taken drone footage of the sites and coupled them with maps. Having a drone record the sites makes the Community Development web site much more useful to developers and residents alike.

<http://arcg.is/2bxa3Y0>

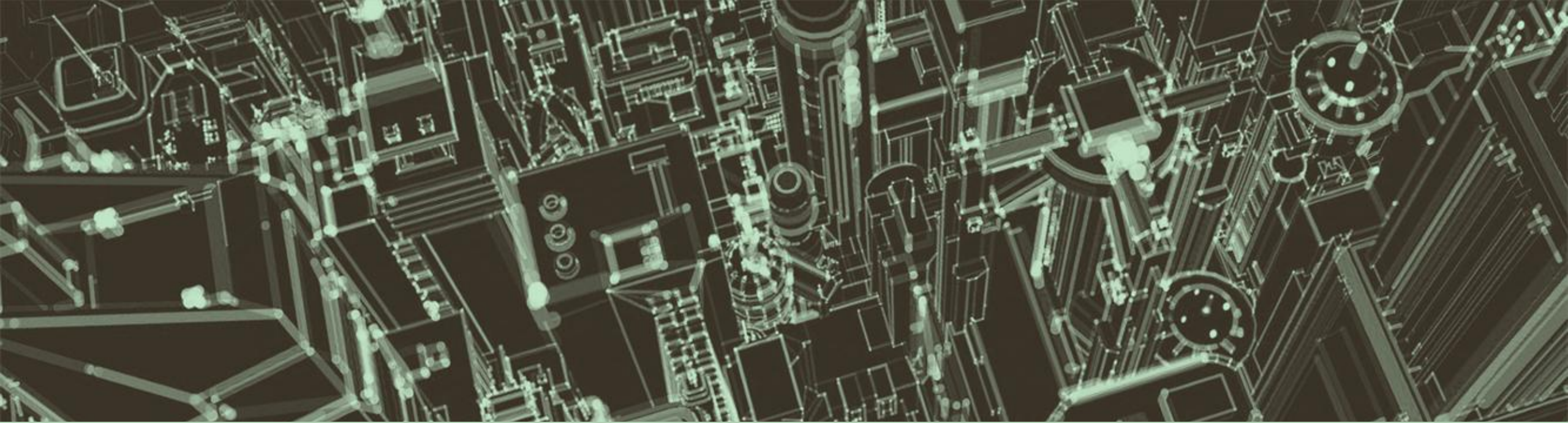


Vernon Hills Proof of Concept: Building Dept. Inspections

While not yet implemented, the ability to inspect and do 3D reconstruction is a promising use for drones in Vernon Hills.

The Building Dept has expressed interest in using drone footage to inspect pylon and wall signs to insure that electrical boxes and raceways were installed correctly. Currently, the Building Department is not able to do this.





Drone Project Questions?



Mission Planning Demo